ABSTRACTS OF PAPERS

SUBMITTED FOR PRESENTATION TO THE SOCIETY

The following papers have been submitted to the Secretary and the Associate Secretaries of the Society for presentation at meetings of the Society. They are numbered serially throughout this volume. Cross-references to them in the reports of the meetings will give the number of this volume, the number of this issue, and the serial number of the abstract.

314. Professor R. P. Agnew: *On existence of linear functionals defined over linear spaces.*

A functional $r(x)$ defined over a linear space E is called an r-function (over E) if there exists a linear functional $f(x)$ with $f(x) \leqq r(x)$ for all $x \varepsilon E$. In order that $r(x)$ may be an r-function, it is necessary and sufficient that, for each $x \varepsilon E$, the greatest lower bound of $\sum_{k=1}^{n} r(t_k x_k)/t_k$, for all finite sets of positive numbers $t_1, \cdots, t_n$ and elements $x_1, \cdots, x_n \varepsilon E$ with $x_1 + \cdots + x_n = 0$, be non-negative. Moreover, if $r(x)$ is an r-function, then the greatest lower bound of $\sum r(t_k x_k)/t_k$, for all finite sets of positive numbers $t_1, \cdots, t_n$ and elements $x_1, \cdots, x_n \varepsilon E$ with $x_1 + \cdots + x_n = x$, is a p-function (Banach, *Théorie des Opérations Linéaires*, p. 28) $p^{(r)}(x)$ with $p^{(r)}(x) \leqq p(x)$; and $p^{(r)}(x)$ is the largest p-function with $p(x) \leqq r(x)$. (Received August 2, 1937.)

315. Mr. H. W. Alexander: *The role of the mean curvature in the immersion theory of surfaces.*

This paper falls naturally into two parts. In the first part an expression is obtained for the second fundamental tensor of a surface in terms of the mean curvature and its first and second derivatives, and the first fundamental tensor $g_{\alpha\beta}$ and its derivatives. These expressions are then substituted in the equations of Codazzi to obtain two third order differential equations in the mean curvature, which are completely integrable, and which are necessary and sufficient conditions that a quantity K_m be the mean curvature of a surface whose first fundamental tensor $g_{\alpha\beta}$ is given. In the second part, singularities of immersion of intrinsically regular surfaces are discussed, and are shown to be points where the mean curvature is infinite. Under a simple basic supposition, it is proved that the locus of such points is a regular curve E, "the edge of regression," and that the coordinates of the surface in the neighborhood of E are regular functions of the arc length along E and the square root of the arc length along geodesics orthogonal to E. Also, in the neighborhood of E there exists a second surface, applicable to the first and meeting it cuspidally. (Received July 31, 1937.)